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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/788,743
Filing Date: February 25, 2004
Appellant(s): AKERS, DOUGLAS W.

October 9, 2007

Susan Chetlin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 3/22/07 appealing from the Office action mailed 1/16/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

10/269,807; 10/383,096; 09/932,531.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

- Derlet et al., "A positron annihilation lifetime spectroscopy study of porous silicon using a continuous lifetime fitting algorithm," Journal of Materials Science Letters 15 (1996), pp. 1949-1952.

- Banzuch et al., "Study of the Van Cittert and Gold iterative methods of deconvolution and their application in the deconvolution of experimental spectra of positron annihilation," Nuclear Instruments and Methods in Physics Research A 384 (1997), pp. 506-516.
- Zhu et al., "Analysis of positron annihilation lifetime data presented as a sum of convoluted exponentials with the program "SPLMOD", Nuclear Instruments and Methods in Physics Research A284 (1989), pp. 443-451.
- Shaffer, "Deconvoluted Doppler Broadened Positron Annihilation Spectroscopy: Characterization of Defects in Aluminum, University Microfilms International, 1985
- Gregory et al., "Analysis of Positron Annihilation Lifetime Data by Numerical Laplace Innversion with Program CONTIN," Nuclear Instruments and Methods in Physics Research A290 (1990), pp. 172-182.
- U.S. 5,200,626 Schultz et al. 04-1993

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the appellant regards as his invention.

9.1 Claims 1-10, 12-19, and 21-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1 and 21 recite processing the collected positron annihilation data with a Doppler-broadening algorithm that is shown as element 40 in Fig. 2.

Claim 2 recites calculating positron lifetime data from the positron annihilation data and prompt gamma ray data, by positron lifetime algorithm 38, as shown in Fig. 2.

Appellant alleges that several different types of Doppler broadening techniques and algorithms have been developed and are being used in the positron annihilation art (see Specification, paragraph 0048). Likewise, appellant alleges that algorithms for determining positron lifetime have been developed and are being used in the positron annihilation art (see paragraph 0046 of the Specification). There is neither an adequate description not enabling disclosure as to how and in what manner: a) one selects the Doppler broadening algorithm or positron lifetime algorithm to use; and b) what, if any modifications have to be done to adapt the selected algorithms to appellant's situation, e.g., how must the constants that are inherently part of any algorithm be evaluated. It is not readily apparent from the disclosure how these should be done.

Appellant claims that positron lifetime is calculated from the positron annihilation data and the prompt gamma ray data. There is neither an adequate description nor enabling disclosure as to, e.g., how to combine the two sets of data and what weight to assign to each set in the combination. It is not readily apparent from the disclosure how these should be done.

Appellant's claimed method of evaluating a material specimen requires the use of algorithms (i.e., Doppler broadening and positron lifetime), detector(s), a neutron source, and a data processor. Appellant does not disclose any other alternative method

of performing the material evaluation that does not require these four elements. Thus, to enable an artisan to make and use an operative embodiment, one must first know which particular algorithm(s) to use, and how and in what manner data from the detectors are to be analyzed in the "data processor."

Appellant's specification basically sets forth the algorithms and data processor as "black boxes" without sufficient details of internals thereof, to enable an artisan to make and use an operative embodiment of the invention, without undue experimentation. See MPEP 2164.06 and *In re Ghiron*, 169 USPQ 723.

Note that an algorithm is a general mathematical approximation of a physical phenomenon. Different algorithms can be used to approximate the same physical event or phenomenon and, depending on the particular situation, circumstances, etc., one of these known algorithms will give a more accurate result than the others.

As an example, the specification indicates that there are different known Doppler broadening algorithms but, fails to disclose which of these known algorithms would be suitable for use in the present invention. Accordingly, due to this failure, an artisan must resort to a trial-and-error process to determine which of the known algorithms to use and, such is considered undue experimentation.

This is especially so since all algorithms contain "constants" that are determined to properly apply an algorithm to a "specific situation." These "constants" are based on various boundary conditions, etc., of the "specific situation" or, in mathematical terms, each of these "constants" are defined as a function of these boundary conditions. These different boundary conditions are given different weights and combined in a specific

manner, e.g., multiplied by a number (e.g., 3), squared, and then added together, etc. The references in section 8 above, provide clear examples of functional dependencies of these constants to specific conditions where these algorithms are applied.

Thus, before one can even apply a given algorithm to a "specific situation", one must first determine the mathematical equations used to determine each of the "constants" in the given algorithm.

Neither the appellant's specification nor the art of record provides an enabling disclosure of the particular mathematical equations to be used for determining each of the different "constants" in each of the different algorithms.

Thus, it would be undue experimentation for an artisan to utilize a trial-and-error process to go through all of possible mathematical equations (with all possible weighted boundary conditions, etc.) for each of the various known different Doppler broadening algorithms and for each of the various known different positron lifetime algorithms, to finally determine which one to use in appellant's invention. The examiner's conclusions are supported by MPEP 2164.06(a) and the case law cited therein.

Appellant's illustration of block diagrams labeled data processing system, Doppler broadening algorithm and positron lifetime algorithm, with no description of internals thereof, is similar to the situation in *In re Ghiron* 169 USPQ 723. Appellant's case is also considered analogous to *In re Scarbrough* 182 USPQ 298, wherein Scarbrough had a claim directed to a system of several component parts referred to by a generic name and overall ultimate function. The court concluded that there was no enabling disclosure because the specification did not describe how "complex elements

known to perform broadly recited functions in different systems would be adaptable for use in appellant's particular system with only reasonable amount of experimentation."

While the above, by itself, is considered clear evidence of undue experimentation, one is still not done!

Appellant's specification refers to some of the characteristics of the specimen that is desired for each algorithm to assess, in addition to lattice defects, e.g., oxide inclusions, lattice structure variations, localized composition changes (see page 8, paragraph 0025). Appellant's data processor utilizes the algorithms to process the data from the detectors and then, in some undisclosed manner, further process the output of the algorithm to provide an indication of the presence or absence of a lattice defect and/or "localized composition changes", etc. This indication is actually a probability of a lattice defect being present, since appellant's method is a non-destructive analysis (see paragraph 0003).

If one sets the conditions too loosely, too many specimens will be inaccurately indicated as having a lattice defect. On the other hand, if one sets the conditions too tightly, the inventive system will inaccurately indicate too many specimens as not having a lattice defect when they actually do. In the art of activation analysis, where the claimed invention belongs, the boundary conditions have a profound effect on the accuracy of the results. The situation for appellant's claimed invention is similar, for example, to Schultz et al. (U.S. 5,200,626) who disclose a method and an apparatus for detecting hidden explosives by pulsed neutron and x-ray interrogation. They teach that if the threshold level of the system is adjusted so as to detect small quantities of

nitrogen, then a high false-positive rate results due to the presence of innocent nitrogen containing materials, leading to the necessity of searching an excessive number of packages by hand. On the other hand, if the threshold level is set high to avoid false positives, then the likelihood that actual explosives will escape detection, i.e., false negatives, increases.

In addition, appellant's invention is not just the determination of the presence or absence of just a single lattice defect, which, in itself, would not provide any useful information, but rather, whether there are present enough lattice defects to cause metal fatigue, embrittlement, etc. (e.g., see Specification, paragraph 0068).

Clearly, it is undue experimentation to determine a suitable data processor for determining how and in what manner, the outputs from each of the algorithms is to be processed so as to provide a reasonably accurate non-destructive determination as to whether or not the specimen in question has sufficient lattice defects to be of concern (as indicated in appellant's specification). Note that this is in addition to determining which of the several known Doppler broadening algorithm and which of the several positron lifetime algorithms should be used after going through a trial-and-error process involving different mathematical equations with different weighted boundary conditions, as already set forth above.

However, one is still not done!

The only way to determine whether or not the "chosen" specific Doppler broadening algorithm, and the "chosen" specific positron lifetime algorithm, the "chosen" manner of further manipulating or analyzing the output of the algorithm, actually

provides a reasonable determination of the presence of enough lattice defects to be of concern, is by doing a further analysis of the specimen (such as a destructive testing/analysis) to determine the actual quantity of said lattice defects present and noting how closely the result of this actual testing/analysis correlates to the result from appellant's non-destructive analysis.

Further, to obtain reasonable statistical analysis, one would have to do this for a plurality of specimens. Clearly, such would present undue experimentation.

Additionally, appellant's claim 2 requires the presence of both a Doppler broadening algorithm and a positron lifetime algorithm, and which require the data processor in some undisclosed manner to combine the outputs of these algorithms to indicate a lattice defect.

First, the appropriate algorithm has to be selected from a plurality of available algorithms that appellant himself admits and as taught by the references cited in section 8 above. This selection has to be performed for each of the Doppler broadening algorithms and each of the positron lifetime algorithms.

Next, the results of applying the algorithms have to be combined in order to produce an output data indicative of the presence or absence of a lattice defect. Since appellant has refused to disclose how these algorithms have to be combined, an artisan will have to determine by trial-and-error that may include hundreds or thousands of possible combinations, starting, for example, with 5% Doppler and 95% positron lifetime and up to 95% Doppler with 5% positron lifetime. Additionally, for each selected

combination, the plurality of constants inherently associated with each selected algorithm has to be evaluated.

Then, the results of these hundreds or thousands of possible combinations must be compared to the results from the above referred to as "destructive testing/analysis" of each specimen to determine the manner of combining.

The claims recite the use of "a detector", which language covers both a single detector and a plurality of detectors. Appellant's specification states that both the positron lifetime algorithm and Doppler broadening algorithm, each requires two detectors (see page 14, paragraph 0038). The specification also states that a single detector is used (see page 20, paragraph 0052). Appellant's disclosure is thus clearly insufficient and non-enabling as to which specific known positron lifetime algorithm can be used with only a single detector and, which specific Doppler broadening algorithm can be used with only a single detector.

Appellant shows in Fig. 2 that there is feedback between the data processing system and each one of the elements, Doppler broadening algorithm and positron lifetime algorithm. This feedback is indicated in Fig. 2 as double-headed arrows between the data processing system and each of the two algorithms. There are no details in the specification of how the parts should be interconnected, timed and controlled so as to obtain the specific operations desired by the appellant (see, for example, *In re Gunn* 190 USPQ 402, 406). Additionally, there is no discussion as to what factors comprise the feedback for each one of the three specific elements, when such feed back occurs, whether or not feedback to one algorithm also comes from the

other algorithm, etc. This feedback arrangement provides further proof of necessary modification of the algorithms. If no modification of results were required, appellant would not have indicated this feedback mechanism in his disclosure.

In summary, the examiner has demonstrated above that appellant's disclosure is insufficient and non-enabling, and that undue experimentation would be required by an artisan to make and use an operative embodiment of appellant's claimed invention. The examiner's conclusion is supported by the following sections of the MPEP and the case laws cited therein.

2164.06(a) Examples of Enablement Issues-Missing Information

"It is common that doubt arises about enablement because information is missing about one or more essential parts or relationships between parts which one skilled in the art could not develop without undue experimentation.

I. ELECTRICAL AND MECHANICAL DEVICES OR PROCESSES

For example, a disclosure of an electrical circuit apparatus, depicted in the drawings by block diagrams with functional labels, was held to be nonenabling in *In re Gunn*, 537 F.2d 1123, 1129, 190 USPQ 402, 406 (CCPA 1976). There was no indication in the specification as to whether the parts represented by boxes were "off the shelf" or must be specifically constructed or modified for appellant's system. Also there were no details in the specification of how the parts should be interconnected, timed and controlled so as to obtain the specific operations desired by the appellant.

In re Ghiron, 442 F.2d 985, 169 USPQ 723 (CCPA 1971), involved a method of facilitating transfers from one subset of program instructions to another which required modification of prior art "overlap mode" computers. The Board rejected the claims on the basis, *inter alia*, that the disclosure was insufficient to satisfy the requirements of 35 U.S.C. 112, first paragraph and was affirmed. The Board focused on the fact that the drawings were "block diagrams, i.e., a group of rectangles representing the elements of the system, functionally labeled and interconnected by lines." 442 F.2d at 991, 169 USPQ at 727. The specification did not particularly identify each of the elements represented by the blocks or the relationship there between, nor did it specify particular apparatus intended to carry out each function.

An adequate disclosure of a device may require details of how complex components are constructed and perform the desired function. The claim before the court in *In re Scarbrough*, 500 F.2d 560, 182 USPQ 298 (CCPA 1974) was directed to a system which comprised several component parts (e.g., computer, timing and control mechanism, A/D converter, etc.) only by generic name and overall ultimate function. The court concluded that there was not an enabling disclosure because the specification did not describe how "complex elements known to perform broadly recited functions in different

systems would be adaptable for use in Appellant's particular system with only a reasonable amount of experimentation" and that "an unreasonable amount of work would be required to arrive at the detailed relationships appellant says that he has solved." 500F.2d at 566, 182 USPQ at 302.

2164.06 Quantity of Experimentation - 2100 Patentability

II. EXAMPLE OF UNREASONABLE EXPERIMENTATION

In *In re Ghiron*, 442 F.2d 985, 991-92, 169 USPQ 723, 727-28 (CCPA 1971), functional "block diagrams" were insufficient to enable a person skilled in the art to practice the claimed invention with only a reasonable degree of experimentation because the claimed invention required a "modification to prior art overlap computers," and because "many of the components which appellants illustrate as rectangles in their drawing necessarily are themselves complex assemblages . . . "

9.2 Claims 12-19 and 21-23 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The processing of positron annihilation data by Doppler-broadening algorithm and/or positron lifetime algorithm, which are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The claims are directed to a "method of evaluating a material specimen". As presently set forth, the claims, e.g. claims 12 and 13, recite ONLY the collection and storage of prompt gamma ray data and positron annihilation data. Thus, the claims lack the critical processing of these data to provide the claimed evaluation of a material specimen. The prompt gamma ray data and positron annihilation data recited in the claims are ONLY output signals (counts) from the detector system. These outputs from the detector system still have to be processed by an algorithm in order to provide information, e.g., on lattice damage. Applicant himself admits to this required data

processing by algorithms using a data processor, as evidenced by the following statements in the specification:

> *"The data processing system 24 is operatively associated with the detector system 16 and receives prompt gamma ray data 20 and positron annihilation data 22 produced by the detector system 16. As was briefly described above, the data processing system processes the prompt gamma ray data 20 and positron annihilation data 22 in accordance with a positron lifetime algorithm 38. See Figure 2. So processing the prompt gamma ray data 20 and the positron annihilation data 22 results in positron lifetime data. In addition data processing system24 may also process the positron annihilation data 22 in accordance with the Doppler-broadening algorithm 40." Underlining provided. See paragraph 0042.*

> *"A data processing system 24 operatively associated with the detector assembly 16 processes the prompt gamma ray data 20 and positron annihilation data 22 in accordance with certain algorithms (described below) in order to produce output data that are indicative of a lattice characteristic of the material specimen 12." Underlining provided. See paragraph 0024.*

> *"For example, in one embodiment, the data processing system processes the prompt gamma ray data 20 and positron annihilation data 22 in accordance with a positron lifetime algorithm 38 (Figure 2) to produce lifetime data." See paragraph 0025.*

> *"Positron lifetime data 22 collected during the collection period corresponds to annihilation events resulting from the same events that caused the production of the prompt gamma ray. The data processing system 24 then processes the prompt gamma ray data and positron annihilation data to determine positron lifetime at step 72." See paragraph 0044.*

> *"As was briefly mentioned above the data processing system 24 may also utilize a Doppler-broadening algorithm 40. The Doppler-broadening algorithm 40 assesses the degree of broadening of the 511 keV peak associated with the annihilation gamma rays γ_s produced by the positron/electron annihilation event." See paragraph 0047.*

9.3 Claims 1-10, 12-19, and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as the invention.

The claims are vague and indefinite, and their metes and bounds cannot be determined because of the lack of adequate description and enabling disclosure regarding: a) the proper selection of Doppler broadening algorithm for processing collected positron annihilation data, and the modification of the selected algorithm to fit appellant's case; b) the proper selection and modification of the positron lifetime algorithm for calculating positron lifetime data from the positron annihilation data and the prompt gamma ray data, and the manner of combining these two sets of data.

Additionally, claim 2 is vague, indefinite and incomplete as to how the recited positron lifetime data is to be calculated.

The claims are vague, indefinite and incomplete, and their metes and bounds cannot be determined because the appellant claims a "non-destructive testing method" that STOPS with the collection of raw data. Thus, there is an inconsistency with the specification and/or prior art teachings that render the claims indefinite (see MPEP 2173.03).

Also, the claims are vague, indefinite and incomplete, and their metes and bounds cannot be determined because the preamble (which is directed to a non-destructive testing method) is being given a meaning contrary to its ordinary meaning (MPEP 2173.05(a), part III).

9.4. Claims 12-19 and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the processing of the

positron annihilation data (e.g., see claim 12) and the prompt gamma ray data (e.g., see claim 13) to provide an evaluation of a material specimen. See also section 9.2 above.

Double Patenting

Claim Rejections – Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9.6. Claim 2 is provisionally rejected under the judicially created doctrine of double patenting over claim 3 of copending Application No. 10/383,096. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The examiner notes that appellant did not traverse this rejection (see statement in the section of the brief, entitled, "Status Of The Claims."

(10) Response to Argument

10.1 Appellant alleges that the examiner's rejections are on the same issues that the Board has already decided, i.e., on S/N 10/269,807. The examiner disagrees because:

a) that Board did not have the benefit of evaluating the additional evidence presented by the examiner in section 2 of the March 10, 2006 final Office action, and in sections 8 and 9 above; b) that Board clearly stated in its opinion that its decision, "is NOT binding precedent of the Board."

10.2 Appellant's repetitious arguments on the lack of enablement rejection of the claims can be succinctly summarized as follows:

a) examiner's rejections are based on limitations that are not part of the claims, similar to the case of *Ex parte Lemelson* (e.g., see pages 16-21);

b) no undue experimentation is required to implement the algorithms because they are well known in the art (e.g., see page 23);

c) the level of detail in the specification is greater than a previously issued patent in the same field and therefore enabling (e.g., see page 24);

d) the disclosure is enabled for one detector because the specification notes two detectors (e.g., see page 25).

As to argument a), the specific allegations of the appellant are as follows:

- "None of the claims require the use of a data processor or positron lifetime algorithm" (see, e.g., pages 17, 22 and 24).
- "None of the claims require combining Doppler and positron lifetime algorithm" (see, e.g., page 18).
- "Feedback arrangement between data processing and algorithms 30, 40 is not claimed" (see, e.g., pages 20, 24)

The examiner disagrees. As stated in section 9 above, appellant's claimed method of evaluating a material specimen requires the use of algorithms (i.e., Doppler broadening and positron lifetime), detector(s), a neutron source, and a data processor. Appellant does not disclose any other alternative method of performing the material evaluation that does not require these four elements.

On the matter of the processor and the positron lifetime algorithm, both are required to calculate the positron lifetime data, as recited in claim 2, as evidenced by the following statement in the specification:

> "As was briefly described above, the data processing system 24 processes the prompt gamma ray data 20 and positron annihilation data 22 in accordance with a positron lifetime algorithm 38." Underlining provided. See paragraph 0042.

Also, the specification does not disclose, suggest or even hint of any other means to calculate said positron lifetime data other than by a positron lifetime algorithm. Appellant's repetitive insistence that a positron lifetime algorithm is not required to calculate the positron lifetime, implies there must be some other undisclosed means for calculating this data. In this case, the claims would still be rejected under 35 U.S.C. 112, first paragraph, because the best mode contemplated by the inventor has not been disclosed.

As to the citation of *Ex parte Lemelson*, which appellant uses to equate examiner's rejection of his application, to support is enablement argument, the comparison is a mischaracterization and similar to comparing apples and oranges.

The Board for the cited case disagreed with the examiner's questioning the disclosure with respect to the elements that do not appear in the claimed invention. For

example, the examiner considered the disclosure non-enabling for the measurement of the rear of the automobile, which is not in the claims (see page 5, lines 7+ of the Board decision). In appellant's case, the examiner has shown that the claim elements associated with the rejection are either positively recited in the claims or required in order to exercise the claimed method.

The Board also disagreed with the examiner because it appears that the examiner did not provide adequate support for his conclusion that undue experimentation would be required to make and use the invention. In contrast, the instant examiner has provided a detailed explanation and objective evidence why undue experimentation is necessary even before an artisan can exercise his claimed method.

As to appellant's argument b), the issue is not that the algorithms are well known but that undue experimentation is required to select, modify and/or combine algorithms, as demonstrated by the examiner.

As to argument c) appellant alleges that his disclosure is enabling because the level of disclosure provided in his application is the same as those in Akers (U.S. 6,178,218) or Alex (U.S. 4,064,438). The examiner disagrees.

First, the issuance of the cited patents is not dispositive of the issues raised by the current examiner because his issues are different from those raised by another examiner who examined the application for the cited patents.

Second, the Doppler broadening algorithm in Akers (U.S. 6,178,218) is not modified by feed back from the data processing system and/or possibly the positron lifetime algorithm, unlike the instant application.

Third, as to Alex, his technique is completely different from the appellant's. He does not employ any positron lifetime algorithm or Doppler broadening algorithm in his invention to obtain indication of defects in specimens. Rather, the actual radioactivity-related measurements from the samples are compared with previously prepared reference standards. For example, Alex's non-destructive method for detecting hydrogen embrittlement develops energy distribution curves of gamma ray measurements from various classes of known levels of hydrogen embrittlement, to be utilized as reference standards to indicate the stage of unknown embrittlement within a specimen under examination (see col. 3, lines 55+).

As to argument d), again the appellant is mischaracterizing the issue. The examiner is not arguing the number of detectors that are enabled by the specification. The issue is that the lack of enablement for the specific algorithm to apply when using only a single detector, and the undue experimentation resulting therefrom.

10.2 Appellant's repetitious arguments on the rejection of the claims based on failure to include critical elements can be succinctly summarized as follows:

e) claim 21 includes the limitation regarding the Doppler-broadening algorithm (see page 28)

f) no part of the specification describes the processing step as "key" or "critical" or "essential" (e.g., see page 14, 28-31).

As to appellant's argument e), the rejection states that "processing of positron annihilation data by Doppler-broadening algorithm **and/or** positron lifetime algorithm, which are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure." Underlining provided. Dependent claim 21 includes the limitations of independent claim 12. While claim 21 may recite the Doppler-broadening algorithm, it does not recite the positron lifetime algorithm that is critical to the claim from which it depends, i.e., claim 12.

As to argument f), the instant application is a continuation-in-part of copending application 10/383,096 (see paragraph 0002 of the specification of the instant application). The co-pending parent application, which also bombards a specimen with neutrons and detects the annihilation gamma rays, clearly admits that processing of the outputs of the detector is critical to the exercise of the claimed method for evaluating a material specimen. Note for example, claim 1 is said co-pending parent application, which states:

"A method for evaluating a material specimen, comprising:

bombarding the material specimen with neutrons to create prompt gamma rays within the material specimen, some of the prompt gamma rays being emitted from the material specimen, some of the prompt gamma rays resulting in the formation of positrons within the material specimen by pair production;

detecting at least one emitted prompt gamma ray; detecting at least one emitted annihilation gamma ray resulting from the annihilation of a positron; and

calculating positron lifetime data based on the detected emitted prompt gamma ray and the detected emitted annihilation gamma ray." Underlining provided.

Recitation of the step, "calculating the positron lifetime data" based on the detector signals, is evidence that processing the detector outputs is essential to the method for evaluating the specimen. Again, the only disclosed method of calculating the positron lifetime data is by a positron lifetime algorithm.

In his traverse of the rejection, appellant cites as support for his argument, *Ex parte Kato,* 2002 WL 465390 at *5 ("examiner failed to cite any passage or other statements of record that would establish that any essential element has been omitted from the claim under appeal"). Underlining provided.

The above processing step in the co-pending application provides the objective evidence for the criticality of the missing step in the instant application. Appellant cannot have inconsistent positions on two co-pending applications that are directed to the same method to evaluate a material specimen. Note the following MPEP sections that pertain to information from co-pending applications that are material to patentability of an application is question:

MPEP 2001.05 Materiality Under 37 CFR 1.56(b)

37 CFR 1.56. Duty to disclose information material to patentability.
(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and
(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
(2) It refutes, or is inconsistent with, a position the applicant takes in:
(i) Opposing an argument of unpatentability relied on by the Office, or
(ii) Asserting an argument of patentability.
A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction

consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability

MPEP 2001.06(b) Information Relating to or From Copending United States Patent Applications

The individuals covered by 37 CFR 1.56 have a duty to bring to the attention of the examiner, or other Office official involved with the examination of a particular application, information within their knowledge as to other copending United States applications which are "material to patentability" of the application in question. As set forth by the court in Armour & Co. v. Swift & Co., 466 F.2d 767, 779, 175 USPQ 70, 79 (7th Cir. 1972):
[W]e think that it is unfair to the busy examiner, no matter how diligent and well informed he may be, to assume that he retains details of every pending file in his mind when he is reviewing a particular application . . . [T]he applicant has the burden of presenting the examiner with a complete and accurate record to support the allowance of letters patent.
See also MPEP § 2004, paragraph 9.

Accordingly, the individuals covered by 37 CFR 1.56 cannot assume that the examiner of a particular application is necessarily aware of other applications which are "material to patentability" of the application in question, but must instead bring such other applications to the attention of the examiner. >See Dayco Prod., Inc. v. Total Containment, Inc., 329 F.3d 1358, 1365-69, 66 USPQ2d 1801, 1806-08 (Fed. Cir. 2003).< For example, if a particular inventor has different applications pending in which similar subject matter but patentably indistinct claims are present that fact must be disclosed to the examiner of each of the involved applications. Similarly, the prior art references from one application must be made of record in another subsequent application if such prior art references are "material to patentability" of the subsequent application.>See Dayco Prod., 329 F.3d at 1369, 66 USPQ2d at 1808.<

MPEP 2004, paragraph 9

*Do not rely on the examiner of a particular application to be aware of other applications belonging to the same applicant or assignee. It is desirable to call such applications to the attention of the examiner even if there is only a question that they might be "material to patentability" of the application the examiner is considering. >See Dayco Prod., Inc. v. Total Containment, Inc., 329 F.3d 1358, 1365-69, 66 USPQ2d 1801, 1806-08 (Fed. Cir. 2003) (contrary decision of another examiner reviewing substantially similar claims is material'; copending application may be material' even though it cannot result in a shorter patent term, when it could affect the rights of the patentee to assign the issued patents).< It is desirable to be particularly careful that prior art or other information in one application is cited to the examiner in other applications to which it would be material. Do not assume that an examiner will necessarily remember, when examining a particular application, other applications which the examiner is examining, or has examined. **>A "lapse on the part of the examiner does not excuse the*

applicant."<KangaROOS U.S.A., Inc. v. Caldor, Inc., 778 F.2d 1571, 1576, 228 USPQ 32, 35 (Fed. Cir. 1985).

Appellant also cites paragraph 71 in his specification that allegedly discloses an embodiment of the invention that does not use an algorithm to process the data. This paragraph may be silent as to the use of an algorithm but it still recites the requirement to process the data, "in order to provide information indicative of the build-up of accumulation of defects during the collection period." Thus, the method DOES NOT stop at data collection but proceeds to data processing to yield the required material evaluation. The claims are directed to material evaluation NOT raw data collection.

10.3 Appellant argues that the claim language is not indefinite because:

a) Persons having ordinary skill in the art would understand the algorithms and possess the knowledge required to evaluate the many algorithms available and select those that would be appropriate for the desired application.

b) With regard to the Doppler-broadening algorithm, the written description clearly states that several different types of Doppler-broadening techniques have been developed and could be used. The written description states that the Doppler-broadening algorithm may comprise the algorithm disclosed in U.S. Patent No. 6,178,218.

c) The written description specifically states that systems for detecting positron lifetimes, as well as the algorithms utilized thereby, are well-known in the art and could

be easily provided by persons having ordinary skill in the art after having become familiar with the teachings of the present invention.

The examiner disagrees.

As to argument a), the examiner has shown that the issue is not that the algorithms are well known but that undue experimentation is required to select, modify and/or combine algorithms, as demonstrated by the examiner.

As to argument b), again, although several Doppler broadening techniques have been developed they cannot be used directly and undue experimentation is required to modify them. As to Akers (U.S. 6,178,218), his method is different from the instant application because his Doppler broadening algorithm is not modified by feed back from the data processing system and/or possibly the positron lifetime algorithm.
As to Alex, his technique is completely different from the appellant's because he does not employ any positron lifetime algorithm or Doppler broadening algorithm in his invention to obtain indication of defects in specimens. Rather, the actual radioactivity-related measurements from the samples are compared with previously prepared reference standards.

As to argument c), again the positron lifetime algorithms may be well known but they cannot be used directly and undue experimentation is required to modify them to fit applicant's case.

10.4 Appellant argues that the claims are not incomplete because:

a) Claim 21 contains the limitation, "processing the positron annihilation data in accordance with a Doppler-broadening algorithm to produce output data indicative of an accumulation of lattice damage over time."

b) There is no language in the specification which describes as "critical" or "essential" a step of processing data by Doppler broadening or positron lifetime algorithm, and the originally filed claims did not include a processing step.

The examiner disagrees.

As to argument a), while claim 21 may recite the Doppler-broadening algorithm, it does not recite the positron lifetime algorithm that is critical to the claim from which it depends, i.e., claim 12.

As to argument b), the co-pending parent application, 10/383,096, which also bombards a specimen with neutrons and detects the annihilation gamma rays, clearly admits that processing of the outputs of the detector is critical to the exercise of the claimed method for evaluating a material specimen. Appellant cannot take the position that the processing step is not critical because this is inconsistent with said co-pending application.

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Ricardo J. Palabrica, Ph.D.
Primary Examiner

Conferees:

Meredith Petravick

Jack Keith

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte DOUGLAS W. AKERS

Appeal No. 2005-0855
Application No. 10/269,807

HEARD: May 18, 2005

Before PATE, MCQUADE, and BAHR, Administrative Patent Judges.
MCQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Douglas W. Akers originally took this appeal from the final rejection (mailed June 16, 2003) of claims 1 and 8 through 39, all of the claims pending in the application. After the appellant's main and reply briefs (filed October 3, 2003 and January 13, 2004) and an examiner's answer (mailed December 1, 2003) had been made of record, the examiner issued an Office action (mailed February 25, 2004) reopening prosecution and entering superseding rejections of all of the claims. Pursuant to 37 CFR § 1.193(b)(2)(ii), the appellant then submitted a request that the appeal be reinstated (filed April, 14, 2004) and

a supplemental brief (filed August 2, 2004). The examiner, implicitly granting the request, entered a second answer (mailed September 14, 2004) and forwarded the application to this Board for review of the new rejections of claims 1 and 8 through 39.

THE INVENTION

The invention relates to "methods . . . for performing non-destructive testing of materials using positron annihilation" (specification, page 1). Representative claim 1 reads as follows:

1. A method, comprising:
determining whether a specimen to be tested includes at least one positron emitter therein that will be activated in response to photon bombardment;
selecting a positron emitter to be activated;
determining a threshold photon energy required to activate the selected positron emitter;
determining a half-life of the selected positron emitter; and
when the half-life of the selected positron emitter is less than a selected half-life, then performing a rapid activation/analysis process, said rapid activation/analysis process comprising:
activating for an activation time the selected positron emitter by bombarding the specimen with photons having energies at least as great as the threshold photon energy;
detecting for a detection time gamma rays produced by annihilation of positrons with electrons in the specimen; and
repeating said steps of activating for an activation time and detecting for a detection time until detecting a sufficient number of gamma rays to determine at least one material characteristic of said specimen;

when the half-life of the selected positron emitter is greater than or equal to the selected half-life, then performing a normal activation/analysis process, said normal activation/analysis process comprising:

activating the selected positron emitter by bombarding the specimen with photons having energies at least as great as the threshold photon energy; and

detecting gamma rays produced by annihilation of positrons with electrons in the specimen.

THE REJECTIONS

Claims 1 and 8 through 39 stand rejected under 35 U.S.C. § 112, first paragraph, as being based on a specification which fails to comply with the enablement requirement.

Claims 1 and 8 through 39 also stand rejected under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter the appellant regards as the invention.

Attention is directed to the main, reply and supplemental briefs and the second answer for the respective positions of the appellant and the examiner regarding the merits of these rejections.[1]

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[1] In the Office action which reopened prosecution, claims 1 and 8 through 10 additionally stood rejected under 35 U.S.C. § 112, first paragraph, as being based on a specification which fails to comply with the written description requirement. Upon reconsideration, the examiner has withdrawn this rejection (see page 2 in the second answer). Presumably, the examiner also has withdrawn any reasoning relating to the two remaining rejections which was set forth in the Office action but not restated in the

(continued...)

DISCUSSION

I. Preliminary matter

In the supplemental brief (see pages 3, 4 and 17) and second answer (see pages 11 and 12), the appellant and the examiner debate the propriety of the Office action which reopened prosecution subsequent to appeal. As this matter is not directly connected with the merits of any issue involving a rejection of claims, it is reviewable by petition to the Director rather than by appeal to this Board (see In re Hengehold, 440 F.2d 1395, 1403-04, 169 USPQ 473, 479 (CCPA 1971), and hence will not be further addressed in this decision.

II. The 35 U.S.C. § 112, first paragraph, rejection

The dispositive issue with respect to the enablement requirement of 35 U.S.C. § 112, first paragraph, is whether the appellant's disclosure, considering the level of ordinary skill in the art as of the date of the application, would have enabled a person of such skill to make and use the claimed invention without undue experimentation. In re Strahilevitz, 668 F.2d 1229, 1232, 212 USPQ 561, 563-64 (CCPA 1982). In calling into

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[1](...continued)
second answer (see Ex parte Emm, 118 USPQ 180, 181 (Bd. App. 1957)).

question the enablement of the disclosure, the examiner has the initial burden of advancing acceptable reasoning inconsistent with enablement. Id.

The examiner considers the appellant's disclosure to be non-enabling in four respects:

> . . . There is neither an adequate description nor enabling disclosure as to what is encompassed by the term, "activating a positron emitter". A "positron emitter" is inherently already activated, i.e., it is radioactive.
>
> At best, the use of the term "activating a positron emitter" is superfluous.
>
> At worst, the term would imply that a positron emitter is either being transformed to another positron emitter or its energy level is further raised by the energy of the activating photon. There is no support in the specification for either one of these two alternatives [second answer, page 3];
>
> There is neither an adequate description nor enabling disclosure as to how and in what manner potential interferences in the data are accounted for in the analysis. For example, Claim 1 recites the step of bombarding the specimen with photons at least as great as the threshold photon energy required to activate the selected positron emitter and detecting gamma rays produced by annihilation of positrons with elections in the specimen.
>
> . . . [T]here is no support as to how one would differentiate between the signals from the selected positron emitter and from the non-selected ones [second answer, pages 6 and 7];
>
> There is neither an adequate description nor enabling disclosure as to how and in what manner one should select an algorithm from a plurality of available algorithms, modify/manipulate the selected algorithm and evaluate the constants in the selected

> algorithm to fit Appellant's situation. Appellant himself admits in the specification that there is not only one known algorithm but rather a plurality of known positron lifetime algorithms (e.g. see paragraph 0058), Doppler broadening algorithms (paragraph 0057) and three-dimensional imaging algorithms (e.g., see paragraph 0060).
>
> . . . There is no support as to how and in what manner one selects the specific algorithm to use for the two activation/analysis processes, to evaluate requisite constants and to modify the selected algorithm to Appellant's situation [second answer, page 7];

and

> There is neither an adequate description nor enabling disclosure as to how and in what manner one can determine when the half-life of the selected positron emitter is less than a selected half-life (*sic*), where the composition of the specimen is unknown and it is this composition that is desired to be determined. The same lack of support exists for the determination of when the half-life of the selected positron emitter is more than a selected half-life (*sic*) [second answer, page 8].

A fair assessment of the appellant's disclosure shows that the references therein to "activating" a positron emitter through photon bombardment of the specimen would be understood by the artisan as synonymous with "producing" or "forming" the positron emitter from a stable precursor. For example, the specification states that "photons 16 from the photon source 12 produce such neutron-deficient isotopes . . . referred to herein in the alternative as 'positron emitters'" (page 7, emphasis added), and

that "one way for generating positrons is through the formation within the specimen 18 of neutron-deficient isotopes, i.e., positron emitters" (page 20, emphasis added). In the same vein, the specification describes Tables I and II (on pages 21 and 22) as identifying "those isotopes that may be converted into positron emitters by photon bombardment" (page 20, emphasis added). Thus, even if the appellant's description of "activating" a positron emitter is somewhat inaccurate as urged by the examiner, it is so only in the most hyper-technical sense. Read in context, the appellant's terminology would not pose any enablement problem from the perspective of a person having ordinary skill in the art.

The examiner's concerns as to possible interference between respective signals produced by the selected positron emitter and non-selected positron emitters and as to the half-life of the selected positron emitter also are unfounded, primarily because they are not commensurate with the scope of the invention disclosed and claimed by the appellant. In this regard, the claims do not exclude the activation of multiple positron emitters, and indeed the appellant's specification (see pages 8, 13 and 14) actually allows for such activation. The claims also

do not require the composition of the specimen to be unknown, and are not directed to a method for determining the composition of the specimen.

Finally, while the appellant's disclosure does not convey much detail as to the various algorithms described therein, these algorithms admittedly are generally known in the art. The examiner has failed to advance any cogent reasoning as to why the disclosure would not have enabled a person having ordinary skill in the art to employ these algorithms, without undue experimentation, to the extent required by the appealed claims.

Hence, the examiner's position that the appellant's disclosure, considering the level of ordinary skill in the art as of the date of the application, would not have enabled a person of such skill to make and use the claimed invention without undue experimentation is not well taken. Therefore, we shall not sustain the standing 35 U.S.C. § 112, first paragraph, rejection of 1 and 8 through 39.

III. The 35 U.S.C. § 112, second paragraph, rejection

The second paragraph of 35 U.S.C. § 112 requires claims to set out and circumscribe a particular area with a reasonable degree of precision and particularity. In re Johnson, 558 F.2d

1008, 1015, 194 USPQ 187, 193 (CCPA 1977). In determining whether this standard is met, the definiteness of the language employed in the claims must be analyzed, not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. Id.

The examiner views the appealed claims to be indefinite for reasons essentially similar to those listed above in connection with the enablement rejection. In this regard, the examiner points to the claim limitations relating to (1) the activation of a positron emitter, (2) the positron lifetime, Doppler broadening, three-dimensional imaging and activation/analysis process algorithms and (3) the determination of the half-life of the selected positron emitter (see pages 9 through 11 in the second answer). For the reasons explained previously, the limitations pertaining to the activation of a positron emitter would have been readily understood by the artisan when read in light of the underlying specification. Furthermore, the examiner's criticisms of the claim limitations pertaining to the algorithms and the half-life of the selected positron emitter

focus on the breadth of these limitations. It is well settled, however, that mere breadth does not equate to indefiniteness. In re Miller, 441 F.2d 689, 169 USPQ 597, 600 (CCPA 1971). Accordingly, the examiner's contention that the appealed claims are indefinite is unpersuasive.

Thus, we shall not sustain the standing 35 U.S.C. § 112, second paragraph, rejection of claims 1 and 8 through 39.

SUMMARY

The decision of the examiner to reject claims 1 and 8 through 39 is reversed.